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IMPROVED UNIVERSAL VEHICLE ENGINE, GEARBOX AND LIKE STAND

TECHNICAL FIELD

5 This invention relates to universal stand which provides secure holding various types of vehicle engines and gearboxes and allowing clear access to every side thereof during repair and renovation.

BECKGROUND ART

10 International patent application PCT/IB02/03439 discloses the universal stand capable of holding various types of engines and gearboxes allowing clear access to every side thereof during repair and renovation.

Nevertheless, in said invention it is found that a rear engine plate, that some engines have and which positioned between engine block and fly wheel, cannot be removed
15 from engine while engine is bolted on the stand.

Beside that, some engine have upper holes, which holes are used for bolting engine on the stand, positioned close to each other. In that case upper handles coupled on respective carrying plat have to be longer than lower handles also coupled on
20 prevent the fly wheel being removed from or returned to engine while engine is on the stand.

Also some large engine have upper holes mentioned in previous paragraph positioned so close to lower holes that upper handles close to lower handles, i.e. the angle between each upper handle and corresponding lower handle is too small in
25 what case engine may not be completely secure on the stand.

Also above mentioned invention requires usage of adapters to centre engines which is inconvenient.

The present invention is intended to provide and improved device to solve these problems.

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DISCLOSURE OF THE INVENTION

It is a primary object of the present invention to provide an improved universal vehicle engine, gearbox and like stand that enables a rear engine plate to be removed from and returned to engine while engine is on the stand.

- 5 It is a second object of the present invention to provide an improved universal vehicle engine, gearbox and like stand that enables the fly wheel to be removed from and returned to engine while engine is on the stand regardless of type and size of engine.

- 10 It is another object of the present invention to provide an improved universal vehicle engine, gearbox and like stand that enables secure holding thereof on the stand regardless of type, size and weight thereof.

It is one more object of present invention to provides an improved universal vehicle engine, gearbox and like stand that enables easy centring of engine, gearbox and like without adapters.

- 15 The invention includes:

- Standard mobile T-shaped base; two vertical support members one of which fixed on said base and stationary and another fixed on the foot and movable by said foot along the length of the leg of said base; two horizontal support members, each of said horizontal support members fixed on the top of respective vertical support member ,
- 20 said horizontal support members being the tubes, two rotatable adjustable arms having a plurality of holes defined in parallel circles along the length of each of said arms, each of said arms placed into respective horizontal support member; a pair of carrying plates; adjustable handles, each handle having an elongated slot to be adjustably attached on the respective plate, a carrier means and a crib.
- 25 Said carrier means includes two pairs of bolts, each of said pairs of bolts being fixed next to first end of said respective arm such that lengthwise axes of said bolts and said arms are parallel, said first ends of the arms facing towards each other; a pair of adjustable connecting means, each of adjustable connecting means includes preferably an elongated slot established along the length thereof to adjustably receive
- 30 said bolts fixed on respective arm to facilitate centring of engine, first end of adjustable connecting means being free and second end thereof fixed on the one side

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of the said respective carrying plate, each of said carrying plates includes a plurality of holes in lower part thereof to be adjustably coupled with adjustable handles and preferably a slot along the length of the upper part thereof to be adjustably coupled with a bar means. Said bar means having preferably two elongated slots established
5 along the length thereof for better adjustment in relation to said carrying plates and to type and size of engine.

The crib includes a pair of L-shaped bar members, each L-shaped bar member comprising preferably a plurality of holes defined in the vertical part thereof to adjustably engage with respective pair of said bolts fixed on respective arm and
10 preferably plurality of holes defined in the horizontal part thereof; at least two pairs of frames and at least two pairs of long bolts, the upper ends of each pair of long bolts being adjustably engaged with holes defined in the horizontal part of said respective L-shaped bar member and the lower ends of each pair of long bolts being firmly coupled onto upper sides of said respective frames; at least a pair of supports,
15 each of said supports threaded freely through opposite frames to relate to said L-shaped bar member to form a support for engine, gearbox and like when it should be needed kept on the stand released of the handles.

Further objectives and advantages of the present invention will become apparent from a detailed description provided herein below, with appropriate reference to
20 accompanying drawings.

BRIF DESCROPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the assembled invention;

Fig. 2 is a partly exploded view of the carrier means with corresponding L-shaped
25 bar member 50

Fig. 3 partly exploded view of the carrier means with handle 45

Fig. 4 explode view of the crib

BEST MODE FOR CARRYING OUT THE INVENTION

Reference will now be made in detail to the present preferred embodiment of invention, an example of which is illustrated in the accompanying drawings:

Referring to Fig.1 the present invention includes standard T-shaped base (1) rather
5 placed on the wheels (6) one of which is rather castor. The base includes two legs
(2,3) connected rather by a bolt with L-shaped means (4) and connecting means (5)
which are, in illustrated embodiment, welded. The invention further includes two
vertical supports (7, 17). The vertical support (7) is firmly connected to the
connecting means (5) and being stationary, and the vertical support (17) is firmly
10 connected to the foot (13). The foot (13) is placed rather around the leg (3) capable
of moving along the length of the leg (3) and has locking means (15,16) provided to
lock foot in desired position. Two horizontal supports (9, 18) are firmly connected to
the respective tops of the vertical supports (7, 17) to receive respective rotatable
adjustable arms (21). Each of the arms (21) has plurality of holes (22, Fig. 2) defined
15 in parallel circles along the length of the arm (21).

As best shown in Fig 1 and 2. the invention includes a carrier means (35). The carrier
means (35) comprises two pairs of bolts (36). The bolts (36) being without heads.
Each of pair of bolts (36) is fixed on the respective rotatable adjustable arm (21)
next to the first end of each arm in such a way that lengthwise axes of each pair of
20 bolts (36) and of respective arm (21) are parallel. The first ends of arms (21) faced
each other.

In accordance with the invention the carrier means (35) includes a pair of adjustable
connecting means (37). Each of the pair of adjustable connecting means comprises
preferably a slot (38) established along the length thereof to adjustably receive the
25 respective pair of bolts (36) fixed on respective arm to facilitate centring of the
engine, gearbox and like. Two pairs of suitable washers (36a) respectively and two
pairs of corresponding nuts (36b) respectively are located on bolts (36) to locks
respective adjustable connecting means (37) in desired position. The first ends of the
adjustable connecting means (37) stay free, and second ends thereof are fixed on the
30 respective carrying plate (24). Each of carrying plates (24) includes preferably a
plurality of holes (39) in the lower part thereof and preferably a slot (40) along the

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length of the upper part thereof for better and easier adjustability with the bar means (41) to be described. Each of the carrying plates (24) is provided with at least one adjustable handle (26).

In the illustrated embodiment the carrier means further includes a bar means (41).

- 5 The bar means (41) has established rather two slots (42) aligned along the length thereof for the bar means (41) is to be stronger in the middle thereof and the bar means is to be adjustably coupled on the carrying plates (24) by corresponding bolts (43) which are secured by suitable washers (44, Fig.3) and nuts (44a Fig.3). The carrier means (35) includes at least one adjustable handle (45). The adjustable handle
- 10 (45) has an elongated slot (47) to be adjustably coupled on the bar means (41) by corresponding bolt (46) and a tube (48) welded on one end of the handle (45). The tube is extended from the edge of the handle (45) for the thickness of the bar means (41) to be on the same plane with the handles (26) fixed on the carrying plates (24). As best shown in Fig 2 and 4 the stand includes a crib (49). The crib (49) comprises
- 15 a pair of L-shaped bar members (50). Each L-shaped bar member (50) has preferably a plurality of holes (51) defined in the vertical part thereof to be adjustably engaged with respective bolts (36) fixed on the arms (21). Two pairs of suitable washers (36c) respectively and two pairs of corresponding nuts (36d) respectively are located on bolts (36) to lock L-shaped bar members (50) in desired position. Each L-shaped
- 20 bar member (50) also has preferably a plurality of holes (52) defined in horizontal part thereof. The crib comprises at least two pairs of long bolts (53), each of the bolts (53) has an upper end and a lower end, upper ends of the bolts (53) are adjustably engaged with holes (52) defined in the horizontal parts of respective L-shaped bar members (50) and secured by suitable nuts (54). The crib (49) also includes at least
- 25 two pairs of frames (55), the upper sides of the frames are firmly coupled with corresponding lower ends of the bolts (53); and at least a pair of supports (56), each support (56) is freely threaded through two opposite frames (55) to relate to L-shaped bar member (50) to form a support for engine, gearbox and the like when it should be needed kept on the stand released of the handles (26 and 45).
- 30 In operation of the invention, as best seen in Fig 1, when an engine is brought between the adjustable connecting means (37), locking means (15,16) of the foot

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- (13) and the bolts (43) on the bar means are released to enable adjustment of distance between the vertical supports (7, 17) to correspond to the size and/or type of the engine. Once desired position of the foot (13) and of the bar means (41) is achieved the locking means (15, 16) on the foot (13) and the bolts (43) on the bar means
- 5 respectively are tightened to prevent the displacement thereof. Afterwards position of adjustable handles (26, 45) on the carrying plates (24) and on the bar means (41) is adjusted such that the corresponding bolts threaded through the handles are to be received in the corresponding holes of engine and the bolts are tightened.
- Engine to be easily manually rotated on the stand around its cross axis, cross axis of
- 10 engine has to coincide with imaginary axes of rotatable adjustable arms (21). This coincidence is achieved by simple movement of the adjusting connecting means (37) on the bolts (36) fixed on the arms (21).
- Should the engine have extended or coupled part(s) on the block side(s), which can be the case, the vertical support(s) (7 and/or 17) may prevent rotation of engine.
- 15 Then desired distance between the vertical support(s) (7 and/or 17) and the involved engine can be reached by adjustable arm(s) (21).
- In a case where engine has rear engine plate, the crib (49) is placed by L-shaped bar members (49) on corresponding bolts (36) to enable the removal of the plate from the engine while engine is on the stand. The position of the supports (56) in relation to
- 20 engine is adjusted by long bolts (53) and once the fly wheel is removed from the engine, the bolts which connect the handles (26, 45) with the engine are released and engine remains on the supports (56) and rear engine plate is removed. Then the released bolts connecting the handles (26, 45) with the engine are tightened again and crib is removed.
- 25 Therefore present invention provides vehicle engine, gearbox and like is to be hold from three directions what enables secure holding thereof on the stand and provides every side thereof to be accessible to operator during repair and renovation regardless of the type, size and weight thereof. Also the invention provides fly wheel regardless of type of engine and rear engine plate to be removed from and returned to
- 30 engine while engine is on the stand and easy centring of engine, gearbox and like without use adapters.

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The stand may be formed of any suitable material preferably of metal.

The invention provides an economical, mobile, simple, adjustable in many ways, practical, easy assembled and disassembled stand.

Although the invention has been explained in relation to its preferred embodiment, it
5 is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.